CLAIMS

What is claimed is:

1. A method for horizon binning for an area of interest comprising:

a. merging an attribute file with attribute values with a second horizon file, wherein the second horizon file is a member of the group consisting of a time file with time values and a depth file with depth values, wherein merging the attribute file with the second horizon file forms a merged file;

b. identifying an area of interest of the merged file forming an identified area file;

c. identifying a time range for a time horizon file or a depth range for a depth horizon file over which to perform analyses on the identified area file;

d. proposing a theory that the identified area has at least a portion that is contiguous between a hydrocarbon area and a water-bearing area;

e. binning the identified area of interest using a file with a first value, wherein the first value comprises time values and depth values, wherein binning the merged file with the first value forms a plurality of bins in specified increments;

f. computing a calculated value for each bin forming a computed value, for at least one member of the group comprising:

i. an average of attribute values within the bin;

ii. an average absolute value of the attribute values within the bin;

iii. a standard deviation for the attribute values within the bin;

iv. a maximum of the attribute value within the bin;

v. a minimum of the attribute value within the bin;

vi. a range of attribute values within the bin;

vii. a range of attribute absolute values within the bin;

viii. a median for the attribute value within the bin;

ix. a mode for the attribute values within the bin;

x. a skewness for the attribute values within the bin;

xi. a plurality of defined moments for attribute values within the bin; and

xii. combinations thereof;

g. creating a plot by plotting the computed value relative to the first value for each bin;

h. viewing the plot to ascertain if a discontinuity would correspond to a fluid contact;

i. using a discontinuity with a water reservoir model and at least one hydrocarbon reservoir model to confirm the theory; and

j. using the discontinuity to determine a boundary between the water reservoir model and the hydrocarbon reservoir model and the corresponding water reservoir and the corresponding hydrocarbon reservoir for an identified area.

2. The method of claim 1, wherein the merging of the attribute file and the second horizon file is performed using geographic coordinates comprising:

a. X-Y prospect coordinate system;

b. X-Y field development system;

c. latitude and longitude;

d. internal 3D seismic survey coordinates; and

e. combinations thereof.

3. The method of claim 1, wherein the area of interest is identified using coordinates of a set of closed polygons.

4. The method of claim 1, wherein the area of interest is identified using a set of closed polygons.

5. The method of claim 1, wherein the identified area of interest is the geographic intersection of the area of interest and the merged file.

6. The method of claim 1, wherein the time horizon file is a set of two-way seismic time values depicting the seismic travel time from the datum to the horizon of interest and back to a datum.

7. The method of claim 1, wherein the depth horizon file is a set of values that depict the depth from a datum to the horizon of interest.

8. The method of claim 1, wherein the attribute file is at least one member of the group comprising:

a. a set of compiled seismic reflection data, processed using a defined attribute generating algorithm and extracted for a horizon of interest;

b. a set of compiled seismic reflection data processed using a defined attribute generating algorithm in conjunction with a horizon of interest;

c. a set of compiled seismic velocity data processed using a defined attribute generating algorithm and extracted for a horizon of interest;

d. a set of compiled seismic velocity data processed using a defined attribute generating algorithm in conjunction with a horizon of interest;

e. a set of geophysical gravity data extracted for a horizon of interest;

f. a set of geophysical gravity data compiled for a horizon of interest;

g. a set of geophysical gravity data collected for a horizon of interest;

h. a set of geophysical remote sensing data extracted for a horizon of interest;

i. a set of geophysical remote sensing data compiled for a horizon of interest;

j. a set of geophysical gravity data collected for a horizon of interest;

k. a set of compiled geologic measurements for a horizon of interest;

l. a set of collected geologic measurements for a horizon of interest;

m. a set of petro-physical measurements for a horizon of interest;

n. a set of compiled or collected engineering data for a horizon of interest; and

o. combinations thereof.

9. The method of claim 1, wherein the area of interest is selected from the group consisting of a geographic area for a hydrocarbon reservoir, a geographic area for a water reservoir, a contiguous hydrocarbon and water reservoir, and combinations thereof.

10. The method of claim 1, wherein the specified increments range from about 1 foot to about 500 feet.

11. The method of claim 1, wherein the specified increments range from about 1 millisecond to about 100 milliseconds.

12. The method of claim 1, wherein the hydrocarbon reservoir interfaces with the water reservoir at the greatest extent of hydrocarbon saturation in a down structure direction.

13. The method of claim 1, wherein the hydrocarbon reservoir interfaces with the water reservoir at a discontinuity in hydrocarbon saturation.

14. The method of claim 1, wherein the proposed theory recites that an interface is located at a position comprising:

a. a single depth;

b. a single two way seismic travel time ; and

c. combinations thereof.

15. The method of claim 3, wherein the area of interest is the interior of the closed polygon.

16. The method of claim 3, wherein the closed polygon is defined using geographic coordinates comprising:

a. X-Y prospect coordinate system;

b. X-Y field development system;

c. latitude and longitude;

d. internal 3D seismic survey coordinates; and

e. combinations thereof.

17. The method of claim 15, wherein the area of interest is the union of the interiors of the

closed polygons.

18. The method of claim 17, wherein the closed polygon is defined using geographic coordinates comprising:

    a. X-Y prospect coordinate system;

    b. X-Y field development system;

    c. latitude and longitude;

    d. internal 3D seismic survey coordinates; and

    e. combinations thereof.

19. The method of claim 5, wherein the geographic intersection is created by constructing a field of sets taken from the merged file,

    a. wherein the field of sets comprise a geographical location G, attribute at geographical location G, horizon time value at geographic location G, and horizon depth value at geographic location G; and

    b. further, wherein all such geographic locations G are within the area of interest.

20. The method of claim 6, wherein the datum is the reference elevation from which travel times in a seismic dataset time file is measured.

21. The method of claim 7, wherein the datum is the reference elevation from which depths for a horizon of interest are measured.